

Nuclear Baseline and the Management of Organisational Change

A Good Practice Guide



EDF Energy (NNB)

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Executive summary

Introduction

Globally, many serious accidents and events stem from failures within organisations. In a significant number of cases, events have been caused or made more severe by inadequate consideration of the safety implications of the organisation's structure, such as staffing and change management arrangements.

Defining the organisation's structure, staffing and controlling changes have clear business benefits. It can improve resource planning, training and logistics to ensure capabilities and skills within the business are used efficiently and effectively.

Prior to publication of Issue 1 of this Good Practice Guide (GPG) in October 2010 there had been a lack of guidance for the nuclear industry on good practice in these areas. The Safety Directors' Forum commissioned this GPG to help organisations define, build and maintain nuclear safety capability and facilitate the sharing of good practice and a consistent industry approach.

This GPG describes how integration of these processes is the most effective approach both from a nuclear safety and business point of view.

This GPG sets out a nuclear capability framework, covering core organisational capability and design issues. It describes how capability requirements for new and existing organisations are defined and justified. It summarises how to manage capability through analysing shortfalls and vulnerabilities and managing organisational changes.

It defines and includes examples of good practice.

The Safety Directors Forum (SDF) has endorsed this GPG as an approach the industry are encouraged to implement. SDF recognises however, that a one-size fits all approach would not necessarily be appropriate across all of the disparate UK nuclear industry. Although alternative approaches may be adopted by some licensees, they should remain consistent with the principles in this GPG. The generation and implementation of this GPG is an opportunity to drive standard setting and establish consistent good practice.

Both the Office for Nuclear Regulation (ONR) and Defence Nuclear Safety Regulator (DNSR) have participated in the development of this guidance and ensured it is compatible with the relevant regulatory requirements and currently represents relevant good practice.

In the years since publication of Issue 1, individual licensees / Authorisees have faced a range of business challenges including size reduction, merging with other licensees, financial challenge and licensing of new build. Good control of baselines and management of organisational change has been fundamental to enabling smooth transitions around these challenges. The Nuclear Industry has found the document to be useful and informative. The response to the document has been universally positive from existing and prospective new build licensees through to Ministry of Defence (MoD) Authorisees. The document has also helped to bring the industry and regulators closer together in terms of understanding the requirements and the practical issues of compliance with them.

Issue 2 of this GPG drew on the hard won experience gained by licensees and Authorisees from three years of deployment and incorporated guidance on compliance with the changes to the Nuclear Baseline and management of organisational change aspects of Licence / Authorisation Condition 36. It did not address the financial provisions of LC/AC36. Issue 3 has made the document into a Good Practice Guide.

This document will remain under review as experience accumulates.

Disclaimer

This Good Practice Guide has been prepared on behalf of the Nuclear Industry Safety Directors Forum by the Nuclear Safety Capability Working Group. Statements and technical information contained in this Good Practice Guide are believed to be accurate at the time of writing. However, it may not be accurate, complete, up to date or applicable to the circumstances of any particular case and this Good Practice Guide does not constitute a standard, specification or regulation. We shall not be liable for any direct, indirect, special, punitive or consequential damages or loss whether in statute, contract, negligence or otherwise, arising out of or in connection with the use of information within this Good Practice Guide.

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Introduction

Purpose and scope

- 1 The intention of this Good Practice Guide (GPG) is to help organisations define, build and maintain nuclear safety capability through the Nuclear Baseline and to control subsequent changes to the organisation.
- 2 While it is essential to securing nuclear safety capability, the acquisition of skills and experience by individuals through, for example, a systematic approach to training is outside the scope of this GPG.
- 3 This GPG represents the industry's understanding of good practice which, if followed, should promote a consistent approach that satisfies regulatory requirements.

Terminology

- 4 Throughout this GPG the following terminology applies:
 - Nuclear safety refers to nuclear and radiological safety, security of nuclear materials and protection of the environment from radioactive discharges.
 - Licensee refers to a licensee, authorisee or accredittee.
 - Licence Conditions (LC) also refers to Authorisation Conditions (AC).
- 5 A complete set of definitions is provided in Appendix A.



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Background

- 6 Organisational factors are a significant cause of industrial disasters and serious events often as a result of inadequate safety culture which allows commercial pressures to take precedence over safety. One aspect is the erosion of organisational capability as confirmed by the following examples:

- Esso Longford – fatalities arising from a fire and explosion following the transfer of key expertise away from the plant without adequate consideration of potential consequences.
- Fukushima – The Nuclear Accident Independent Investigation Commission concluded ‘the root causes were the organizational and regulatory systems that supported faulty rationales for decisions and actions’.
- Columbia disaster – the Columbia Accident Investigation Board concluded ‘the safety organisation, due to lack and capability of resources....was not an effective voice for discussing technical issues or mission operations’.
- BP Texas City – the Baker Report concluded, among other shortcomings, ‘BP has not always identified resources for strong process safety performance at its five US refineries.’

7 Just as nuclear licensees will normally make a safety case for the operation of nuclear plant, the Nuclear Baseline is a significant part of the ‘safety case for the organisation’.

8 A nuclear licensee would not modify safety-related plant without prior risk assessment. Similarly, changes to the organisational structure or human resources that design, construct, commission, operate and decommission plant need an equal level of consideration with nuclear safety included from the earliest optioneering stage. Ill-conceived or poorly implemented change can have a major impact on both safety and business performance as illustrated by the examples given above.

9 Safety is a combination of many aspects of business, including plant and processes, management arrangements, quality and the capabilities of the organisation and people within it. Global experience shows the most effective and efficient organisations combine safety and business delivery in an integrated approach.

10 Accountability for ensuring that human resources are adequate for nuclear safety rests with the Board of the organisation. Specific accountability for governance of this, and for the Nuclear Baseline, should be clear and should rest within the most senior management of the organisation. The process of developing and maintaining the Nuclear Baseline should be facilitated by a suitably qualified and experienced person(s). Line management should be accountable for the accuracy and currency of information within it. These arrangements need to be captured within the business management system.

11 Normal business practice should inherently deliver compliance with LCs so demonstration remains only a formality. Add-on or back-fitted compliance arrangements encourage a poor safety culture aimed at the appearance rather than spirit of compliance, which leads to a build-up of latent threats.

Governance

12 Nuclear licensees have governance structures and arrangements to ensure the safety of their operations. These should extend to the oversight of the organisation and its suitability, making senior management clearly accountable and demonstrating ownership.

13 The governance arrangements should ensure that the guidance of this GPG is implemented, with key aspects subject to independent review and assessment. This may be through specific structures or through existing arrangements and should include some level of engagement with the Nuclear Safety Committee established pursuant to LC13.

This document

14 The Good Practice Guide has been produced by a working group set up under the auspices of the Safety Directors Forum (SDF) and has sought to distil good practice from across a broad spectrum of the UK nuclear industry.

Both the SDF and the working group welcome comments on how the GPG can be improved for potential future revisions. Please see Appendix D for further information.

Readers Guide

15 The document is divided into five main sections and a series of appendices. A series of self-assessment prompt statements is included at the end of each section. These are based on the collective experience gained by the Working Group in development of organisational Nuclear Baselines and the management of organisational change. The prompts pick up key features from the section and are aimed at assisting an organisation to test the scope and completeness of their arrangements and documentation.

16 Throughout the document a series of statements are highlighted with a border round them. These Key Points represent hard won lessons gained by the Working Group and have stood the test of time since they were first published in Issue 1 of the GPG. They should be carefully considered and adhered to in development of arrangements and documentation. In Issue 1 these were called Principles but the Working Group considered that Key Point is a more accurate definition of their intended purpose. They are highlighted throughout the document and aggregated in Appendix E.

Nuclear Capability and Organisational Design

Introduction

17 Licensees in the UK Nuclear Industry cover a broad range of activities with many different management and commercial arrangements ranging from design and construction, through operation and maintenance, to decommissioning.

18 Each licensee should clearly understand the nuclear capability required to deliver business safely and effectively. This capability should be documented as part of the management system.

19 A Safety and Environment Management Prospectus (SEMP) together with the Nuclear Baseline, is a requirement for any organisation applying for a nuclear site licence. The SEMP sets out a high level description of business activities, organisation and resource strategy, together with a summary of management arrangements in place to ensure safety. The SEMP should be maintained as a live part of the management system.

20 The first step in demonstrating a licensee has adequate nuclear capability is to understand clearly the nuclear activities being undertaken. Once this has been completed the licensee can identify the organisation, roles and numbers of personnel required to deliver and maintain nuclear safety – the Nuclear Baseline.



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Core capability

21 A licensee is required to remain in control of the nuclear safety of its activities. This is achieved through its core capability. (The approach to service providers and their presence in the Nuclear Baseline is discussed in paragraphs 44-52.)

Key Point - The licensee should understand its core capability and maintain it within its own organisation.

22 For the purpose of this GPG, core capability is the enduring ability to understand hazards and safety cases and to control activities so that they remain safe. This is exercised through:

- Governance – the command and control of safe operations to defined standards which meet legal and LC requirements. Operations in this context include maintenance, examination and testing, and the treatment, processing, keeping, storing, accumulating or carriage of any radioactive material or radioactive waste.
 - Design Authority (DA) – the understanding and maintenance of the design intent and its safe operating envelope.
 - Intelligent Customer (IC) – the capability of the organisation to have clear understanding and knowledge of the product or service being supplied by a service provider.
 - Internal regulation – a healthy, independent challenge and audit function.
 - A strong safety culture as described in INSAG-15, including:
 - commitment;
 - compliance with procedures;
 - conservative decision making;
 - open reporting culture;
 - challenging unsafe acts;
 - being a learning organisation;
-
- Operating and maintaining nuclear plant safely to defined standards.
 - Understanding technical issues, e.g. understanding hazards, safety cases, design and maintenance, human factors, and reliability.
 - Strong leadership (in the context of this GPG, this will include ownership of Nuclear Baseline, control and management of organisational change).
 - Effective control and supervision.
 - An ability to understand and respond to legal requirements.

The relationship between core capability of the organisation and the Nuclear Baseline is illustrated in Figure 1.

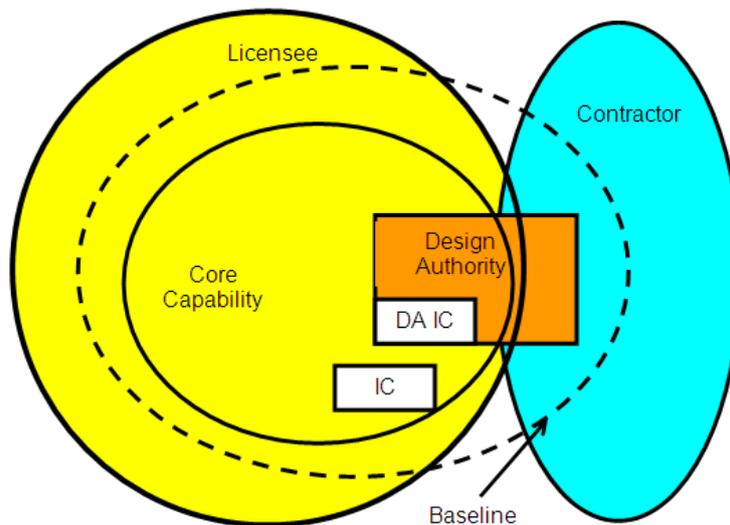


Figure 1 Core capability of a nuclear licensee

Organisational design criteria

23 Organisations should be designed from a clear understanding of current and future business activities and their nuclear safety implications. It should enable understanding of dependencies within the organisation and with service providers.

24 Careful consideration needs to be given to the design of an organisation to ensure nuclear safety functions are identified and resources assigned. Criteria underlying this should be articulated in the management system and used to inform the Nuclear Baseline.

Key Point - Careful consideration needs to be given to the design of an organisation to ensure nuclear safety functions are identified and resources assigned.

25 Organisational Design (OD) criteria should:

- Provide a high level framework with which to design the organisational structures.
- Reinforce accountabilities.
- Support business efficiency by having similar activities aligned and organised in a consistent manner to aid mobility of resources.
- Promote consideration of the implications for changing structures when undertaking any organisational change.
- Demonstrate strategic and day to day control.
- Control the balance in the use of internal and external resources.

26 OD Criteria may include:

- Span of control – a leader cannot effectively manage too many direct reports. Span of control should be determined by the nature, variability and complexity of the work and capabilities of direct reports. Typically there will be 4–8 direct reports at senior levels and 8–15 at lower levels.
- Levels of hierarchy – flat versus hierarchical structure. Flatter structures can aid communication and decision making.
- Roles and responsibilities (including authorities for decision making) – the roles and responsibilities of leaders, individuals and teams should be clearly identified and described with appropriate accountability.
- Decision making – decisions should be delegated to the lowest practicable level to minimise bureaucracy, speed up processes and develop people.
- Functional structure – functional as well as delivery management lines should be considered where they differ, for example in matrix organisations.
- Customer focus – the expectations of customers and stakeholders should be given appropriate priority throughout the change process.
- Maintenance of capability – the functions or authorities accountable for maintaining capability should be defined.

27 While it is evident organisations which have evolved over many years may not meet such criteria, they should nevertheless be measured against them in order to reveal potential weakness. This will help to provide an impetus for positive change.

28 Implementation of OD can be further supported by the production and maintenance of a set of model structures with consistent post titles (and defined responsibilities) aligned to the defined criteria. These can form a template on which to base new structures and may also be used to monitor organisational drift when compared to the current structures. The logic for any proposed variance from the model structures should be captured and considered whenever organisational change is proposed.

Self assessment

29 Gather and review evidence to demonstrate:

- That the current and future activities which impact upon nuclear safety and what the organisation is licensed to do are defined.
- That the processes to derive and maintain the core capability required to manage work safely are clearly defined, transparent and testable.
- How the organisation ensures that it has the capability to generate, understand and operate within the Safety Case.
- That the organisational design criteria are clearly defined and understood.
- The relationship between the organisation's activities and their hazards, the core capabilities and Nuclear Baseline, and the Management System.

Constructing the Nuclear Baseline

Introduction

30 This chapter gives guidance on constructing the Nuclear Baseline. The Nuclear Baseline together with the SEMP may be considered as the safety case for the organisation. It should be owned and used by directors and managers at all levels to support safe, effective decision making and help them understand the health of the business along with the risks and opportunities this presents. The intended outcome is a tool providing a clear statement of required capability and human resources for the efficient and timely execution of all nuclear safety-related activities by the licensee.

31 The Nuclear Baseline enables the assessment of organisational capability.

32 The Nuclear Baseline should be capable of interrogation to support decision making at all levels. At local level it should allow individual managers to identify and address vulnerabilities within their sphere of responsibility. At strategic level it should provide information about the gross organisational vulnerabilities requiring action. The identification of vulnerabilities against the Nuclear Baseline is described in paragraphs 68–86.

33 The Nuclear Baseline should show or should signpost to other information that shows how the organisation and range of capabilities described are designed to manage the activities and hazards of the organisation's work and facilities safely.

34 The Nuclear Baseline should be maintained as a living management tool integrated with the minimum of bureaucracy into the normal staff resourcing processes. This is best achieved where the Nuclear Baseline is a useful aid for normal business planning, not merely for the purpose of meeting legal requirements such as environmental permits or LC36, although it should remain possible to distinguish nuclear safety requirements from other business needs.



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What is a Nuclear Baseline?

35 The Nuclear Baseline is a document, a database, or a combination of both which sets out or provides a route map to, with regards to nuclear safety:

- How the organisation is structured in diagrammatic form.
- How safety is governed.
- How accountabilities and responsibilities flow through the organisation, including where appropriate through matrix and project organisations.
- How it is populated, posts and roles.
- What human resources it requires in terms of numbers, capabilities and competencies to deliver the nuclear safety related activities.
- How it is demonstrated that these resources and capabilities are adequate.

36 The Nuclear Baseline provides an understanding of nuclear safety-related activities and which parts of the organisation and structures support them.

Management of a Nuclear Baseline

37 The process of developing and maintaining the Nuclear Baseline should be facilitated by a suitably qualified and experienced person(s). Line management should be accountable for the accuracy and currency of information within it. These arrangements need to be captured within the Business management system.

38 Nuclear Baseline data is often managed as a subset of a broader HR management system. Practical considerations include:

- How information is captured, e.g. structured questionnaires, interviews, workshops.
- How it is presented and integrated into normal business practices.
- Who the users of the Nuclear Baseline are.
- The format and level of detail they each require.
- What the relevant nuclear activities are.
- Which managers are responsible for them.
- Who plans the associated resource levels.

39 It is important that there is clear governance of and due process for, the Nuclear Baseline. Key data and information, e.g. scope of work, role definitions and resources should be independently validated by SQEP individuals. The Nuclear Baseline should be the accountability of a suitable senior executive concluding that the organisation is structured and resourced to conduct nuclear activities safely. Independent challenge should be provided. Figure 2 illustrates a process for the development of a nuclear baseline.

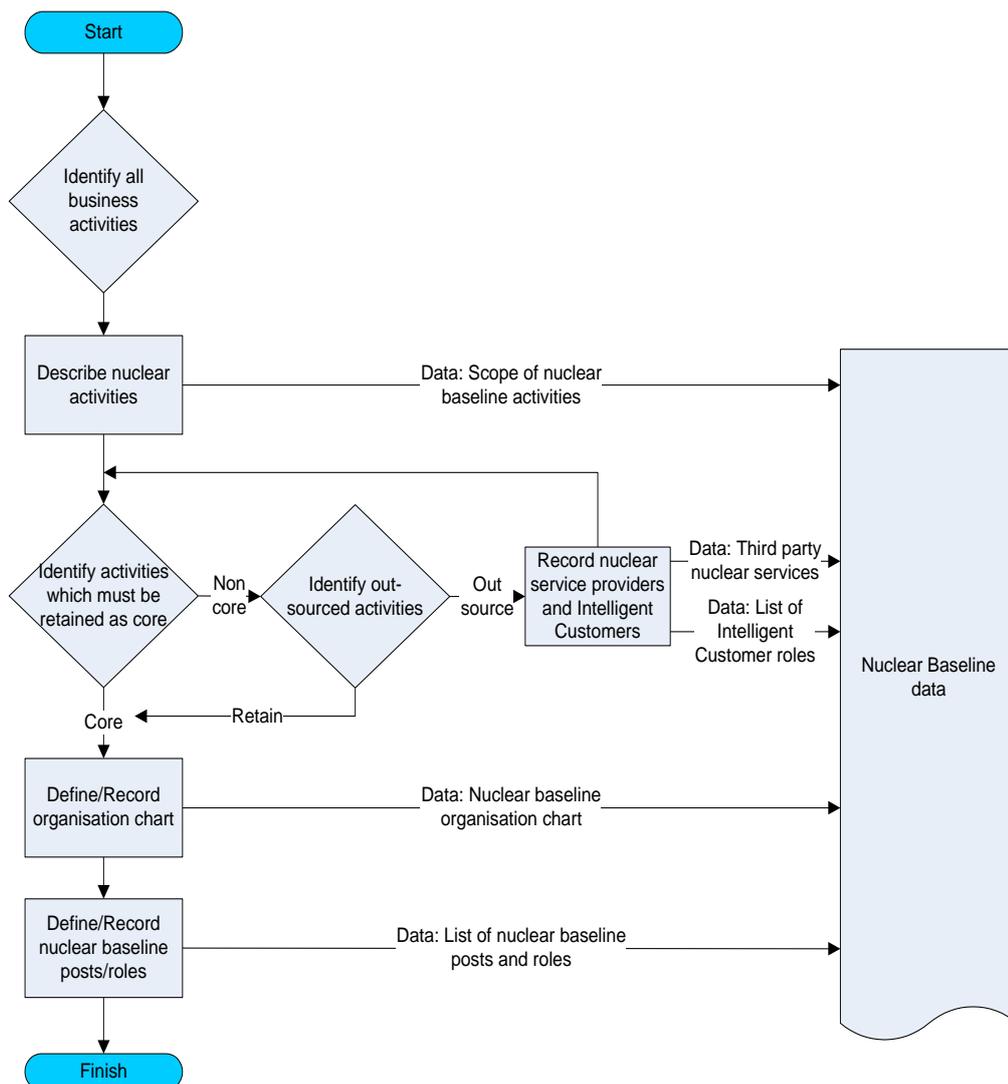


Figure 2 Nuclear Baseline flowchart

Organisational structure

40 Organisational structures should be shown in diagrammatic form to help clarify management load, single point vulnerabilities and outsourced activities including the extent of reliance on contractors and/or parent organisations. This representation also greatly facilitates the change management process.

Extent of a Nuclear Baseline

41 Licensees may have historically differing views on the level of activity that should be captured in the Nuclear Baseline which will range from:

- The minimal level of activity necessary to remain safe and compliant.
- That which is required to sustain normal operations.
- That which is required to sustain accelerated operations.

Key Point - In order to be consistent and meaningful the Nuclear Baseline should represent the 'fully capable organisation', **not** the minimum required for safe operation or shutdown – i.e. that necessary to sustain nuclear safety during normal operations and reasonably foreseeable events.

42 It is sometimes argued that all parts of an organisation support nuclear safety, although the link may be very tenuous (for example, catering facilities necessary to feed those who undertake nuclear safety-related work). To subject all parts of the organisation to full scrutiny may diminish nuclear safety through diverting resources from high priority issues, as well as bringing the process into disrepute.

43 Equally, the Nuclear Baseline should not be unduly restricted, e.g. to senior levels of management. Staff at all levels can have significant impacts upon nuclear safety and should be included regardless of whether they are 'merely following orders'. Appendix B sets out illustrative examples of roles that should be included.

Key Point - Relevant roles at all levels and employment status should be considered for inclusion in the Nuclear Baseline.

Service providers

44 Most licensees use service providers, which include contractors, agency-supplied workers and support from other organisations including parent and partner organisations, to conduct or support nuclear activities. The involvement of service providers in nuclear activities can be described in three levels as outlined below.

45 **Category 1** service providers undertake an enduring Nuclear Baseline role continuously needed for safe operation. They effectively operate as manpower substitutes for the licensee, and are in practice part of the licensee's organisation. Therefore the resource has to be covered by the Nuclear Baseline and subject to the associated controls.

46 This might include contractors employed for specific projects over significant periods where they might have an impact on nuclear safety (for example, supporting the design and safety case work for a new facility). These resources may be included in either the licensee's Nuclear Baseline or in a separate Nuclear Baseline that follows the requirements of this GPG and is open to inspection and audit by the licensee.

47 **Category 2** service providers undertake specific tasks under contract that are not needed continuously including the provision of short-term resources. Examples may include crane maintenance or the use of contract safety case authors to cover abnormally high workloads. Such roles will not be appropriate for inclusion in the Nuclear Baseline, but the licensee should be an intelligent customer for this.

48 **Category 3** service providers perform a function over which the organisation has no direct control, such as security forces where these are determined by security plans, emergency services, local authorities and regulators, and are not appropriate for inclusion in the Nuclear Baseline.

49 In order to fulfil nuclear safety obligations, all Category 1 and 2 service providers should be subject to formal arrangements that clearly identify the nature of the work, requirements that should be followed and precautions that should be taken.

50 The licensee organisation should also have defined Intelligent Customer capability, shown in the Nuclear Baseline, to manage nuclear safety-related work carried out by all Category 1 and 2 service providers. This requirement includes gaining assurance that the service provider organisation has, and continues to have adequate suitably qualified and experienced person (SQEP) resources and quality assured processes to work safely. Necessary Intelligent Customer interfaces with Category 3 providers should also be established and maintained.

51 An organisation needs to keep the ratio of employees compared to resources provided by service providers under review to ensure the licensee retains core capability, remains able to understand the nuclear safety case and is able to both manage and deliver nuclear safety. Consideration should be given to retaining or bringing in-house those controlling and directing functions that are important to nuclear safety.

52 Tenants (those operating under a lease in accordance with LC3) carrying out nuclear activity should either maintain their own Nuclear Baseline, which links to the licensee's Nuclear Baseline, or be included within the licensee's Nuclear Baseline.

Key point – Category 1 service providers should be in a Nuclear Baseline.

Nuclear safety posts and roles

Key point – A nuclear safety post or role is defined as one where an action or inaction by the individual or group:

- undertaking
- supervising
- managing
- governing
- overseeing
- assuring
- challenging
- defining or
- directly supporting

work could pose an immediate or latent threat to nuclear safety.

53 Roles are included as well as posts (see definitions) in order to gain a complete picture of capability and evaluate the true impact of any proposed change. However, a large number of roles potentially increase the complexity of management and the Management of Change (MoC) process. It is therefore recommended that roles, where logical, are grouped together, e.g. by assigning them to a post.

54 Roles allocated to nominated individuals, e.g. subject matter expert, should be held as distinct roles and identified as such on the Nuclear Baseline.

55 Emergency response roles should be clear within the Nuclear Baseline either as a traceable thread (shadow organisation) or as a stand-alone document.

56 There should be a definition of the competence required to discharge each post/role, taking account of the characteristics of the organisation and its range of activities. The achievement and demonstration of competence, which should cover qualifications, training and experience, should comply with LCs 10 and 12 and be addressed through a systematic approach to training which is outside the scope of this GPG.

57 Appendix B provides guidance on those generic posts, roles and functions that may be included in the Nuclear Baseline.



BAE Systems

The numbers required

58 It is necessary to determine the numbers required for each post or role within the Nuclear Baseline. It is helpful for practical purposes to group posts where there is interchangeability, with care not to lose sight of key specific capabilities. In order to serve as a useful reference point, the Nuclear Safety basis for the defined post/roles and the numbers required need to be understood and recorded. The actual number of people in post is in effect a performance measure that should be monitored and risks arising from this managed through the governance process (see para 88). There should be a process in place to determine whether the numbers defined are indeed adequate for nuclear safety.

59 For existing situations, the resource requirement can be based on available evidence – for example quantitative performance indicators such as workload, overtime or maintenance backlogs when staffing levels were at a certain level may provide sufficient justification. Qualitative feedback can also be important.

60 A new organisation or project without an existing complement will require a different approach. This could include data from similar plants, sites or projects and can be supplemented by first-principle analysis if necessary. Benchmarked data should be used with intelligence about context including performance, relevant processes and the regulatory framework within which they operate. Where more predictive approaches are needed, advice can be sought from a human factors specialist.

61 The numbers actually present on any given day may be less (or more) than the Nuclear Baseline figures without necessarily affecting nuclear safety – although it is necessary to understand the vulnerabilities. Short term and temporary absences (training, leave) are a normal part of day to day activities, but long-term absences such as secondments or long illnesses without filling temporary vacancies should be subject to MoC controls as they may impact nuclear safety.

Key point - The licensee should determine the number of staff required to fulfil the posts and roles identified in the Nuclear Baseline, be able to demonstrate that this is adequate for nuclear safety and monitor and manage the risks arising from any variance.

Presenting the information in a useable format

62 Visibility of the Nuclear Baseline and clarity of presentation are essential to ensure all employees understand the impact of changes that could affect nuclear safety.

63 The Nuclear Baseline should be maintained as a live system and subject to change control. Organisations are free to choose a format that best meets their needs. A single Nuclear Baseline makes it easier to identify vulnerabilities and assess changes across the organisation. However, in a larger or more complex organisation this can be difficult to maintain and lead to weak ownership. In such cases the Nuclear Baseline can be subdivided providing the whole can be collated, presented and consistently maintained to a common standard with the same MoC controls.

Justifying the adequacy of the Nuclear Baseline

64 Having produced and populated the Nuclear Baseline, it will be necessary to justify that it meets the requirements for a nuclear safety capable organisation. Suitable documentation should be compiled to demonstrate that the Nuclear Baseline accurately reflects how the organisation is structured and populated to deliver the requirements of the organisation's activities, including emergency response. This should be based on operational experience and include evidence-based projections of future resource needs. Suitable performance indicators should be established and used to review and test the adequacy of the Nuclear Baseline.

65 The arrangements for the Nuclear Baseline should be clear and documented. The arrangements should demonstrate there is effective governance, challenge and senior management ownership of the processes. The arrangements should be subject to review by the organisation's internal challenge function. This review should test whether the Nuclear Baseline is readily retrievable and easily interrogated for information useful to management of safety, and used in practice within the organisation.

Self assessment

66 Gather and review evidence to demonstrate:

- Whether the arrangements for the Nuclear Baseline are clear and documented.
- Effective governance, challenge and senior management ownership of the processes to ensure adequacy of the organisation, including the nuclear Baseline.
- That there are arrangements and SQEP people in place to manage the Nuclear Baseline and ensure that it is accurate and up to date.
- That the Nuclear Baseline accurately reflects how the organisation is structured and populated to deliver the requirements of the organisation's activities, including emergency response.
- That the Nuclear Baseline is readily retrievable and easily interrogated for information useful to management of safety, and used in practice within the organisation.
- That the Nuclear Baseline is adequate for the organisation's purposes, including the use or performance indicators where appropriate, and in line with the SEMP and other relevant documentation.
- That there are evidence-based projections of future resources required (particularly important for new or changing organisations).

Evaluating Nuclear Capability Resilience

Introduction

67 This is achieved by comparing the current structure and resource level to the Nuclear Baseline. This evaluation will expose immediate shortfalls and vulnerabilities, e.g. vacancies and potential loss of key expertise through retirement. This will identify the need for corrective actions, for example compensating for long-term vacancies or absences and endorsing succession or contingency plans.

Key point - Having established, and assessed the adequacy of the Nuclear Baseline the licensee should ensure that compared with the baseline resources are adequate and sufficiently resilient to meet the current and future demands and take appropriate corrective or mitigating action where there are weaknesses.



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Vulnerabilities

68 A vulnerability in the Nuclear Baseline is a current or potential weakness in nuclear safety capability against the current and future demands. These vulnerabilities can be broadly divided into:

- Individual and specific issues that can only be addressed at local level (although appropriate supporting policies and management framework are needed) such as the need for a succession plan for a specific role.
- Issues that concern the organisation as a whole, such as restrictive remuneration, recruitment bans, policies that prevent recruitment of people to fill roles requiring scarce skills and generic risks and patterns.
- External factors such as national or regional skill shortages.

69 Identification of vulnerabilities provides information for managers to take appropriate action. The vulnerability analysis is carried out at both local and strategic level. It is

recommended that the results of such analysis are aggregated and reported through the governance process.

70 The areas of vulnerability outlined in paragraphs 71–85 should be explored during the review of the current organisation against the Nuclear Baseline. A graded approach should be taken.

Vacancies

71 Resolving vacancies should be an integral part of the succession and recruitment processes, and there may be a requirement to make provisional arrangements to compensate (see Management of Change), otherwise a loss of capability can occur.

Competence

72 Given an adequately developed competence management system, it should be possible to clearly establish the competence of post- and role-holders. Vulnerability occurs when clusters of post- or role-holders do not possess the required competence or when a key or specific role is not filled by a fully competent person. Consideration should be given against the lead time required to achieve the appropriate level of competence and the level of staff turnover.

Knowledge

73 The licensee should be aware of tacit, local or specialist knowledge that can be lost through demographic or other staff turnover.

Singletons

74 Singleton vulnerability occurs when the capability of the organisation resides with one individual, and relates to technical rather than managerial competence. Where singletons are identified the implications should be considered and appropriate action taken, for example succession, training or contingency planning.

Service providers

75 Different categories of service provider were described in the previous section. In exploring vulnerabilities particular attention should be paid to threats arising from undue dependence on Category 1 service providers, a high ratio of contractors to employees and inadequate Intelligent Customer arrangements.

76 Where vulnerabilities are identified it may be necessary to mitigate the risk by, for example, strengthening contract terms and oversight, establishing a diverse supplier base and drawing up contingency plans to bring expertise in-house to protect nuclear safety from potential loss of service.

77 External staff may be contracted into the licensee's organisation to provide specific technical expertise, e.g. Category 1 service providers. Reliance on such manpower substitutes creates risks relating to security of supply which should be addressed in a similar manner.

78 If service providers undertake control and supervision of aspects of the licensee's operations, there is further risk the licensee may lose control of its nuclear safety-related operations. The nuclear safety implications should be considered by the licensee and action taken as necessary such as filling roles with in-house staff or secondees.

79 Similar vulnerabilities may be presented by employees with special contractual arrangements such as 'zero hours' and/or post-retirement contracts.

Secondees

80 Secondments can present a potential vulnerability to simultaneous loss of a number of staff, or of loss of SQEP capability should the contract not be managed well. Formal agreements should be used for a licensee to use secondees, for example, Parent Body Organisations have supplied the Executive for some Nuclear Decommissioning Authority

(NDA) sites and the post holders have to be formally seconded into the site licence company's organisation.

Demographics

81 Demographics in this context specifically relates to the age profile of the workforce. Loss of capability may occur when a significant proportion of the workforce is concentrated into a relatively narrow age band which is approaching retirement age, or when there is a cluster of relatively young or inexperienced staff. These demographic issues need to be identified and managed, e.g. redistribution of employees to balance skills and experience, or through training, apprenticeship or recruitment campaigns.

Health issues

82 Vulnerabilities can emerge as a result of specific health issues, such as long term sickness and staff on restricted duties. Appropriate monitoring and corrective action should be instigated and may include the reallocation of roles and responsibilities.

Scarce resources

83 Vulnerabilities can be caused by fluctuations in the job market and resource availability which should be monitored. This could be exacerbated by targeted recruitment pressures from external organisations.

Overloading and overtime

84 Individuals allocated too many roles may have difficulty managing responsibilities and be susceptible to stress. This may be apparent in the Nuclear Baseline from the evaluation of the total workload that the individual roles bring collectively to each post. Where this is high, typical solutions might be to redistribute roles more evenly within the organisation or to employ additional staff or service providers. However, interrogation of the Nuclear Baseline is not a substitute for line management awareness of workload and stress levels.

85 Similarly, sustained high levels of overtime may indicate inadequate resource levels or overloading which also needs to be addressed.

Example of a vulnerability analysis

86 The Nuclear Baseline could be coded to show vulnerabilities, depending on the level of risk e.g. red, amber or green. Each post (combination of roles) should be assessed against the set of vulnerabilities outlined above

These considerations produce a matrix for post vulnerability based on its risk to the business. An example of this is shown below.

Post/role	Number in Nuclear Baseline	Number in post	Vulnerability
Safety manager	1	1	Pending retirement
Principal engineer	1	1	Successors identified.
Senior engineer	2	2	Pending retirement
Engineer	1	1	Singleton without immediate successor.
Technician	1	1	Competence
Safety case author	1	1	Successors identified.
Policy and strategy	1	4	
Regulatory interface	1	1	Competence gaps
Support officer	5	3	Service provider (not a critical role)
Totals	14	15	

RAG Status (for this example):

- Red = Immediate action required. No plan in place.
- Amber = Action/plan underway. Keep under review.
- Green = Under control. No action required.

Mitigation of vulnerabilities

87 Once vulnerabilities have been identified actions should be taken to manage them. This may involve short-term contingency plans to address immediate threats to the business as well as long-term strategies. These actions should be captured and progressed as part of normal business management – providing progress reports to the appropriate management meetings, safety committees and executive meetings where organisational performance is evaluated. Examples of ways to mitigate vulnerabilities are:

- Development of adequate succession plans.
- Elimination of singleton SQEP roles, for example by making roles interchangeable.
- Ensuring resilience of the supply base.

Key point - Action should be taken to manage gaps and vulnerabilities in the Nuclear Baseline.

Governance

88 Results of the vulnerability analysis should be reviewed through the governance structures to ensure that the analysis adequately identifies:

- Shortfalls and other vulnerabilities.
- Corrective actions.
- Contingency plans.

Self assessment

89 Gather and review evidence to demonstrate:

- That the organisation clearly understands its vulnerabilities (including demographics, vacancies, competence, singletons, overload etc.)
- That appropriate contingency / mitigations are identified against vulnerabilities and are being actioned.

Management of Change

Introduction

90 Organisations inevitably go through periods of change which affect the organisational structure and resources. The aim of the MoC process is to effectively control these changes to ensure that they are considered, well planned, carefully executed and benefits are realised without compromising nuclear safety.

91 Safety needs to be considered in the earliest stages of change management. It should not wait for a formal paper submission nor should the MoC process be used to justify previously reached decisions.

92 The organisation's senior management should demonstrate its commitment to the MoC Process and receive periodic updates on the status of organisational change and the implementation of the arrangements.

93 The MoC process should be integrated with the normal human resource management process and proportionately applied in a timely manner utilising SQEP resources. It should be managed with the same rigorous approach as other forms of change control such as plant modifications.



Sellafield Ltd

Recognising the need for change

94 Change is an essential part of business improvement which prevents the organisation becoming complacent and stimulates development. The MoC process begins with recognition of drivers for change, whether due to changes in life cycle, internal aspiration to improve or external factors such as stakeholder requirements, market conditions or legislation.

Initial consultation and engagement

95 It is known that in order for changes to work most effectively, it is important for the staff who may be affected to be actively involved from the start. This can take considerable time and effort that should not be underestimated.

96 Consultation and explanation of the need for change, including its rationale, should be given to stakeholders (including, safety representatives, regulators, and customers as appropriate). This should be done at the earliest opportunity in order to ensure that all relevant views are properly considered before final decisions are made and to achieve buy-in for the change.

Key point - Stakeholders should be actively engaged at the earliest opportunity and through all parts of the change process.

Optioneering

97 It is not always necessary to introduce wholesale change; there may be other ways of addressing issues. The change decision maker should ask the following questions:

- Why are we doing this?
- What do we want to achieve with this change?
- What are the consequences of not changing?
- What are the options?
- Which would be simplest?
- Which would minimise risks?
- Who might be affected?
- Who should be consulted (internal and external)?

98 Consideration should be given to the size and level of changes, effects on other parts of the business, the impact on stakeholders recognising that change can be unsettling, and the complexities and threats associated with managing the transition. The resilience and robustness of the organisation given other changes that may have happened or be happening may also be a factor. Both qualitative and quantitative approaches to optioneering may be necessary.

99 Early advice should be sought from a SQEP resource on the application of the MoC process. If a MoC assessment is warranted then consideration should be given to the strategy for its application, e.g. phases, potential risks and initial categorisation. This will provide an early indication of the level of risk, effort and resource required if change is to be implemented. Simultaneous changes require special consideration in the risk assessment. If the decision is taken to proceed then the reasons for the change, options considered and the rationale for the selected option should be captured as part of the MoC assessment.

Outline and application of the MoC process

100 The MoC process should govern the registration, production, assessment, categorisation, approval and post-implementation review of any proposed change to the organisational structure or resources that have the potential to impact nuclear safety. The normal process set out in the following paragraphs may not be suitable for application to large scale, novel or complex changes. The licensee should retain the ability to adapt the process where appropriate.

101 The following provide examples of when the nuclear safety aspects may be considered through the MoC process, proportionate to their potential impact on nuclear safety:

- Permanent changes to, or having an impact on, Nuclear Baseline posts or roles.

- New programmes and processes introducing changes to posts or roles, competencies or training requirements.
- New projects, which could include new construction, demolition, decommissioning, requiring the introduction of new posts, roles or processes.
- New initiatives, which could significantly increase individual workloads, e.g. new tasks placed on individuals, new IT system.
- Long term vacancies, e.g. sick leave, maternity leave, secondment, sabbaticals, career breaks that have an impact on nuclear safety arrangements.
- Changes to core capabilities, whether or not on the Nuclear Baseline, that might affect the ability to conduct business in a safe and controlled manner.
- Contractorisation of any of the organisation's activities. This should prompt consideration of risks associated with failure to provide the service and level of Intelligent Customer capability required.
- Medium or long term changes to the workload.

102 Some examples of when the MoC process may not be needed:

- Like-for-like personnel changes.
- Short term absences or vacancies.

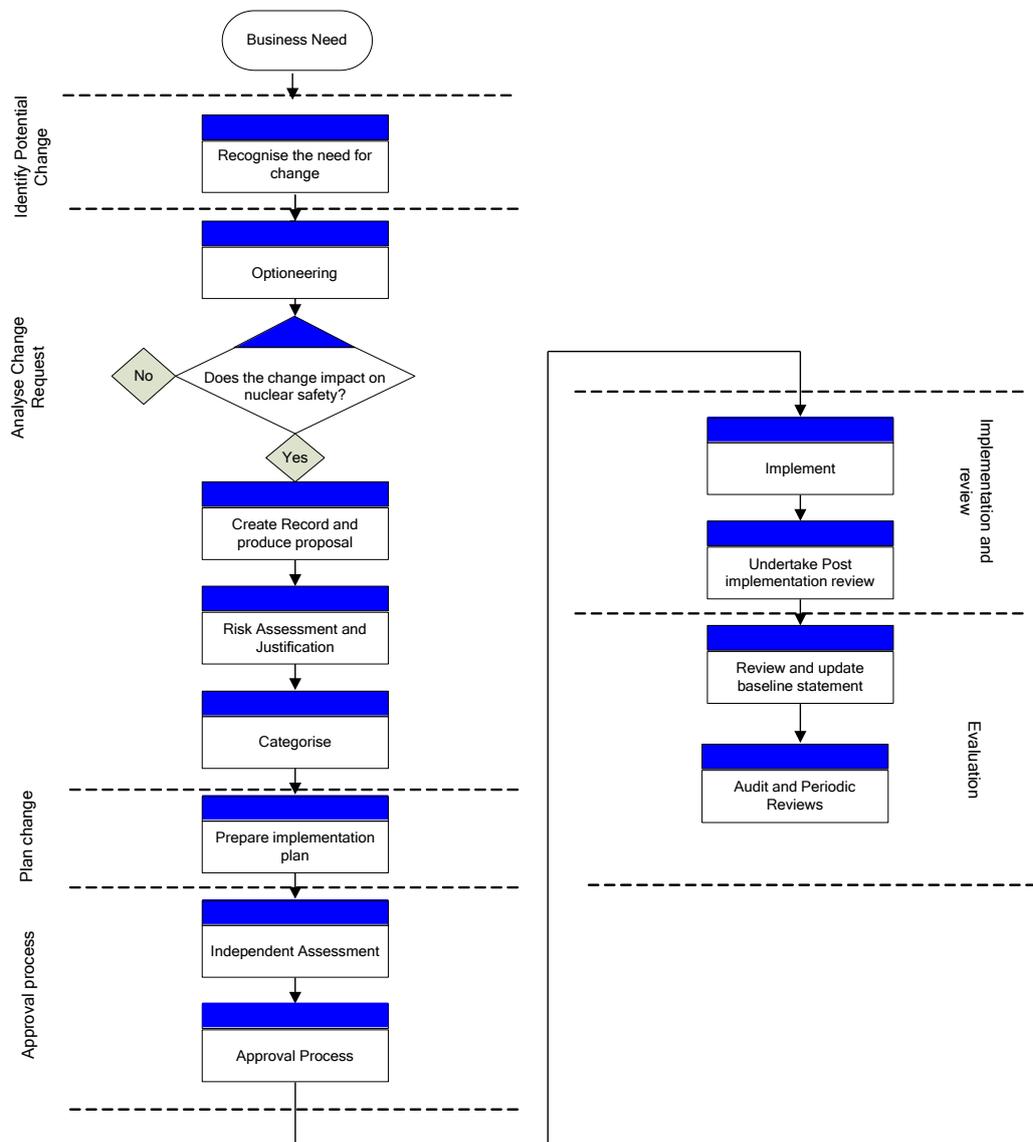


Figure 3 MoC process flow chart

Production of the proposal

103 The sponsor for the change should champion it from start to finish; ensuring due process is properly executed with sufficient SQEP resources allocated. This should result in greater efficiency and less bureaucracy.

104 Changes should not be 'salami-sliced' into smaller units without careful consideration of the consequences on overall safety. This is because several minor changes might combine to produce a major impact. This does not preclude the phasing of large scale changes by producing an overarching change proposal, supported by subsequent more detailed proposals.

105 An overarching change proposal should set out the end vision, phases and hold points, governance links and dependencies between different aspects of the change and arrangements for cumulative impact assessment.

Key point - All changes shall be assessed and approved in advance of being implemented and not 'salami-sliced' into smaller units.

Key point – For complex, compound changes there should be an overarching change proposal setting out the means of controlling risks.

106 The content of a MoC submission (with reference to the Nuclear Baseline) should include:

- A description of the current situation compared to the proposed with clear start and end points.
- Reasons and justification for the change, including the desired benefits.
- Discussion on optioneering, i.e. options considered, option selected and rationale for selection based on desired benefits.
- Proposed criteria by which success will be measured.
- Assessment of potential risks.
- Potential interaction with other changes.
- The proposed preventive measure or mitigation for the identified risks.
- Implementation plans, including necessary enabling actions, preventive measures and means of mitigation.
- Categorisation.
- Monitoring and review requirements.

Risk assessment

107 In identifying potential risks, the originator of the assessment should involve all appropriate stakeholders.

108 The risk assessment needs to:

- Consider risks and consequences should the change be ill conceived or poorly implemented (few organisational changes go 100% to plan).
- Consider both the long and short term risks.
- Consider the change itself and the implementation.
- Consider the risks associated with introducing changes in different phases.
- Consider any interaction with other ongoing changes.

- State how the identified risks are to be managed through 'enablers' (to prevent the risk materialising) and countermeasures/contingency plans (to mitigate the consequences).
- Describe how the effectiveness of the change will be monitored and reviewed through (where appropriate) the use of performance indicators.
- Where there are multiple changes, whether part of an overarching plan or merely coinciding, consider the overall cumulative impact.

109 The types of risk which may need to be considered might include:

Structure

- Provision of funding/resources.
- Organisation design, e.g. number of layers and spans of control.
- Governance arrangements.
- Control and supervision arrangements.

Accountability

- Clarity of accountability.
- Use of consistent post/role titles.
- Roles and responsibilities.
- Potential conflict between roles and priorities.

Resources

- Method of resourcing, e.g. replacing licensee staff with service providers.
- The number and retention of SQEP resources.
- Maintenance of core capability.
- Availability, e.g. location and shift changes
- Competence levels, including the need to review competence requirements for changing work methods/processes.
- Resources to implement the change.
- Staff turnover, gaps in the structure, e.g. vacancies.
- Resources and competences needed for safe operation/shutdown/ fault recovery of the plant, system or equipment.
- Technical and operational supporting resource.
- Effects of multi-skilling.
- Vulnerability e.g. singleton post or scarce expertise.
- Increased dependence upon service providers.
- Retention of Intelligent Customer capability.
- Corporate memory, including loss of critical or historical knowledge.
- Resources and competence required for nuclear emergency response.
- Impact on the ability to operate in compliance with the limitations and conditions of the Waste Management Licences.
- Impact on the ability to operate in compliance with Environment Legislation and permits.

Safety management

- Impact on the arrangements to implement the nuclear site Licence Conditions.
- Compliance arrangements, e.g. will the transfer of role holders to another department leave a gap?
- Would revision to procedures or instructions be needed to reflect the change?

- Management of service providers' arrangements.
- The impact on resource demands of changing procedures or instructions.
- Will important communication and working relationships be affected?
- Changes to the arrangements for Safety Representatives.

People factors

- Safety culture and behaviour, for example potential changes to motivation, prioritisation, morale or team working.
- Networks and interfaces.
- Workload and stress.
- Change fatigue.



EDF Energy

Categorising the change

110 All changes (including temporary) that may have a potential impact on nuclear safety should be categorised in relation to the unmitigated risks arising from the change should it be ill conceived or poorly implemented. Before submission of the MoC the categorisation should be confirmed by an independent SQEP to ensure the appropriate level of scrutiny and approval.

Key point - All changes (including temporary changes) that may have a potential impact on nuclear safety should be categorised in relation to the unmitigated risks arising from the change should it be ill conceived or poorly implemented.

111 The MoC assessment for organisational change with a potential impact on nuclear safety must be formally approved before it is implemented. Management arrangements should therefore enable low-category MoC submissions to be produced and independently approved promptly, with minimum bureaucracy, in the interests of continuing with normal business.

112 LC36 requires changes to be categorised according to their safety significance but does not mandate a mechanism by which licensees should do this. It is common practice within the UK nuclear industry to follow a similar approach to the example below:

Category	Definition	Level of scrutiny	Approval level
A Major effect	Change with a major nuclear safety impact. This includes: <ul style="list-style-type: none"> Large scale downsizing or outsourcing of a nuclear safety significant function. Change that affects the legal basis of the licence. 	<ul style="list-style-type: none"> Independent assessment by SQEP. Relevant Committee for endorsement. Regulator for agreement. 	<ul style="list-style-type: none"> licensee/ director/ board member
B Significant effect	Change with a significant nuclear safety impact. This includes: <ul style="list-style-type: none"> Wide ranging change resulting in significant transfer of responsibilities and accountabilities. 	<ul style="list-style-type: none"> Independent assessment by SQEP. Relevant Committee for review. Regulator scrutiny. 	<ul style="list-style-type: none"> Functional director
C Minor effect	Change with a minor nuclear safety impact. This includes: <ul style="list-style-type: none"> Change within a Business Unit/Directorate with nuclear safety responsibilities. Change that has a minor impact on the company's emergency response organisation. 	<ul style="list-style-type: none"> Independent assessment by SQEP. Relevant committee for review. 	<ul style="list-style-type: none"> Sponsor
D Insignificant effect	Change with negligible nuclear safety impact: <ul style="list-style-type: none"> Change in a function/department/individual post with little or no impact on nuclear safety. 	<ul style="list-style-type: none"> Line manager or MoC co-ordinator. Independent review of categorisation (which can be retrospective). 	<ul style="list-style-type: none"> Line manager

Implementation

113 The implementation of organisational change should follow a change control process where the rigour of the control is proportionate to the category of the change. Senior managers often strive for fast timescales when driving organisational changes and in some cases deadlines can be unrealistic. Undue haste leads to poor design and implementation and should be challenged.

114 Implementation plans can be stand alone documents or included in the MoC assessment. They should include identification of pre- (activities that must be achieved prior to implementation) and post-change actions (activities that can be conducted following implementation). Where deemed necessary, 'hold points' can be utilised to check a change is still on track prior to entering the next phase. 'Shadow working' periods have also been

deployed as a tool to test methods of working, e.g. effective interfaces prior to full implementation.

115 All proposed actions should utilise the SMART (Specific, Measurable, Achievable, Realistic, Timely) principle with the proposed action and target date agreed with the actionee.

116 Implementation plans typically include mitigation to address risks for example:

- Conducting handovers where individuals change post/role.
- Review and completion of training.
- Completion of communication plans (refer to guidance below).
- Arrangements to monitor the effect of the change.
- Review and update arrangements prior to close out.
- Contingency planning.
- Completion of administrative update forms such as staff structure data, asset ownership, training records, document owner and review data.
- Timing and requirements for post-implementation review, feedback and close-out.
- Avoiding unduly lengthy periods of uncertainty in implementing the change.

117 The sponsor of the change shall make adequate arrangements to monitor safe implementation of the proposed change taking appropriate correction action where required to mitigate risk.

118 All proposed changes to approved proposals (proposed revisions to action / review completion dates or scope of the change) shall be controlled, where necessary with resubmission of part or the entire proposal, to ensure that emergent changes are suitably risk assessed and controlled.

Key point - Change implementation needs to be monitored to control variance and prevent deviation from the plan.

Communications plan

119 Identify internal and external stakeholders. This might include 'blue-light' services, local authorities, local liaison committees etc.

120 The change needs to be understood and 'bought into' by staff and other stakeholders rather than aggressively 'sold'. It is important to consider how some messages may be received and, where necessary, after all views have been considered, lead people through any early negativity as quickly as possible.

121 Where a communication plan would be useful, consider the following questions:

- What does the audience need to know and what is expected of them?
- What does the change look like?
- What is the timeline for the change?
- What is the value/benefit to the organisation/function/individual?
- Have all audiences and their key issues been identified?
- Has the appropriate level of consultation been identified with the people likely to be affected by the change?
- How have staff views been considered and responded to during decision making?
- How will concerns be captured, considered and as appropriate acted upon?
- What involvement is needed from senior management in communicating the change?
- Has a mechanism for feedback to/from senior management been established?

- Is the change goal understood?

Independent assessment and approval

122 All management of change proposals should be subject to some degree of independent oversight. The level of scrutiny should depend on the category of the proposed change (see table at paragraph 112). Many licensees find it helpful to have a management of change committee that provides oversight and decision making.

123 Higher category changes should be subject to full licensee due process which may include independent assessment and Nuclear Safety Committee review, followed by submission to the regulators for notification or agreement.

124 Lower category changes can be processed without necessarily being submitted to a safety committee. Non-committee approval removes a large resource overhead given the considerable number of small organisational changes likely to occur in the running of a licensed site, however there should still be some form of independent review. It is also good practice for a management of change or other safety committee to conduct retrospective reviews of the totality of organisational changes.

Monitoring and review

125 As defined by the implementation plan the change should be monitored against identified risks and success criteria, with planned reviews as appropriate. This should include speaking to affected parties and stakeholders.

126 Monitoring and reviews may consider the following questions:

- Have actions identified as necessary been completed?
- Have the risks anticipated been avoided, and benefits realised?
- Are revised roles and responsibilities clear?
- Have any additional/unexpected issues or training needs been identified?
- Have there been impacts from interactions with other changes, and how have they been managed?
- Have there been impacts on performance indicators?
- Was the communications plan effective?
- Was there any need to activate contingency plans?
- Has there been any impact on morale that could adversely affect the business, safety culture or nuclear safety?
- What lessons can be learnt from this change that might be useful for future changes?

127 For significant or major changes (see Table at paragraph 112) an independent close out review may be undertaken to provide assurance that the change has been adequately controlled and implemented.

128 If the review finds the change was ill-conceived or poorly implemented, additional actions may be required to address any issues identified. This may prompt a further review, further MoC action or even a reversal of the change.

Key point - Lessons learnt from organisational changes should be captured and disseminated appropriately.

Close-out

129 A check should be carried out on the close-out of implementation plan actions before the change is considered closed. It is good practice to set a target date for this as part of the implementation plan, and to ensure that arrangements allow for transparency and audit.

130 The Nuclear Baseline should be updated once the change is implemented to ensure that it remains current. Figure 4 below illustrates an approach.

131 A register of all organisational changes should be maintained. Relevant changes can then be reviewed when assessing further organisational change; this also enables the totality of change to be reviewed for potential cumulative impact on Nuclear Safety.

Key Point - Effective oversight should be in place to assess and control the cumulative effect of multiple changes.

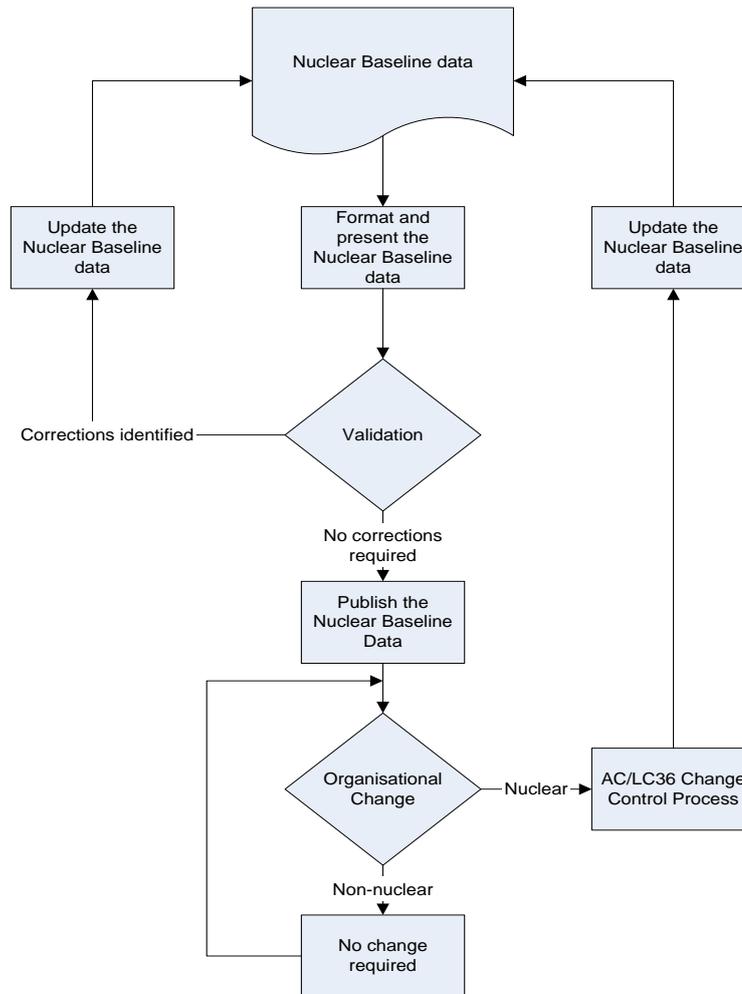


Figure 4 Maintaining the Validity of the Nuclear Baseline

Ownership and coordination of the MoC management arrangements

132 There should be acknowledged process owners whose defined responsibilities should include:

- Ensuring effective processes exist and are applied.
- Acting upon the information provided by assurance activities, performance indicators and other operational feedback.
- Ensuring interfaces between MoC and other processes (internal and external) are correctly identified and referenced.

- Ensuring appropriate training is provided and acting as a focal point for all relevant queries and issues from both a technical and compliance perspective.
- Proactively improving the process and ensuring it is reviewed and updated at the appropriate intervals.
- Ensuring relevant processes are part of the organisation's management system and any modifications to the process are correctly documented and records maintained of any change.
- Reviewing whether the activities required by the process have been properly resourced and conducted by SQEPs.

133 Coordination of these responsibilities should include:

- Maintaining a register of change submissions.
- Ensuring organisational changes are categorised and assessed by an appropriately authorised person or body.
- Verifying that all organisational changes are satisfactorily closed-out.
- Maintaining records of all MoCs.

Self assessment

134 Gather and review evidence to demonstrate:

- That there are documented arrangements for the management of organisational change that are consistent with accepted good practice including this GPG.
- That Senior Management take responsibility for MoC and receive periodic updates on the status of organisational changes and the implementation of the arrangements.
- That the process is being applied appropriately.
- That suitable options have been considered for each change and the preferred option is appropriately justified.
- That the quality of the risk assessment and categorisation is checked and challenged.
- Where multiple changes coincide or form part of a larger plan, these are managed together; avoiding 'salami slicing' and ensuring cumulative effects are considered.
- That there are arrangements to control implementation of approved changes, including use as appropriate of hold points.
- That close out reviews are planned and implemented.

Maintaining and Using the Nuclear Baseline for Capability Management

Monitoring and review of the Nuclear Baseline

135 The Nuclear Baseline should be reviewed and validated periodically to ensure that:

- It still reflects the full scope of relevant operations.
- The resource levels are still adequate.
- No unauthorised organisational change has occurred.

Key Point - Periodic review of the Nuclear Baseline should be undertaken at least annually to ensure that it is current and accurate.

Audit and review of management arrangements

136 Audits of management arrangements should be included as part of the standard quality programme. Where appropriate, an integrated audit programme should provide assurance that the arrangements are robust.

137 Periodically a review should be undertaken to consider the implementation and effectiveness of arrangements and the cumulative effect of the changes raised. This review should include:

- Appropriate application of arrangements, including categorisation.
- Evidence to justify and support changes.
- An assessment as to whether there has been an accumulation of minor changes (salami-slicing) that considered together would add up to a more significant change.



BAE Systems

Forward planning

138 A successful business will have a coherent, integrated approach that secures competent resources to maintain and improve safety. This resourcing strategy should be

coordinated, not merely a collection of separate components, which relates back to the organisation's activities and to its safety cases. For example, there should be clear, direct links between the demands of the safety case, the identified core capability and competence requirements of the business, the Nuclear Baseline and the competence assurance arrangements.

139 The Nuclear Baseline should be used as a tool to enable:

- Succession planning for posts and roles contained within the Nuclear Baseline.
- Identification of SQEP requirements for future projects or where projects will complete and release personnel for redeployment.
- Identification of new roles required along with new training or competences.

Governance

140 The capability of the organisation should be a key consideration of senior management through organisational reviews and governance. This should include consideration of:

- Vulnerabilities in the Nuclear Baseline.
- Management of change effectiveness.
- Maintaining an overview for consistency, cumulative effects, latent organisational conditions, cultural changes and 'salami-slicing'.
- Future developments and their potential impact upon the organisation.
- The output of self-assessment and assurance.

141 This process is greatly assisted by integration of capability governance into the overall company governance structure, and hands-on engagement of at least some of the senior management.

Key point – Governance of capability should be a key consideration of senior management and should be integrated into the overall company governance structure.

Self assessment

142 Gather and review evidence to demonstrate:

- Clear Process Ownership and adequate SQEP resource to implement the arrangements.
- That there are periodic audits that demonstrate management arrangements are robust.
- That there is a periodic review of the cumulative effect of changes raised.
- That there is a periodic review of the Nuclear Baseline to ensure it reflects the full scope of the Business, resource levels are still adequate, vulnerabilities are managed and no unauthorised change has occurred.
- That the Nuclear Baseline is used to enable succession planning, identify capability requirements for future projects and define new roles and/or new competencies.
- Senior management involvement in governance of capability.

APPENDIX A Definitions

Accreditee	Similar to an authorisee who is the approval authority and design authority for nuclear weapons.
Authorisee	An individual in possession of a nuclear authorisation as granted by the Ministry of Defence.
Capability	The sum of the knowledge, expertise and capacity of an organisation to achieve its goals.
Competence	The combination of knowledge, qualifications and experience necessary for an individual to perform a specific role competently.
Design Authority	A defined function within the licensee's organisation with responsibility for establishing, understanding and maintaining the design intent and its safe operating envelope.
Intelligent Customer	The capability of the organisation to have clear understanding and knowledge of the product or service being supplied by a service provider.
Justification	Utilising evidence to demonstrate that relevant requirements are met, e.g. the changes will be beneficial to meet the need or the resources are sufficient.
Licensee	A corporate body in possession of a nuclear site licence granted under the Nuclear Installations Act 1965. For the purposes of this GPG the term also includes the separately defined terms 'authorisee' and 'accreditee'.
Normal operations	The range of normal activities undertaken by the business and including preparedness for emergency situations. It should include sufficient margin to allow for leave, sickness, training etc., and may also include an element for succession/ demographic planning dependant on the specific needs of the business.
Nuclear Baseline	Specifies nuclear posts, roles and associated structures that are required to carry out normal operations and the required numbers.
Nuclear Baseline post/role	A post or role where an action or inaction by the individual or group undertaking, supervising, managing defining or directly supporting work which could pose an immediate or latent threat to nuclear safety. The Nuclear Baseline should include all such posts and roles at any level within the organisation which should be determined from the work to be undertaken.
Nuclear safety	For the purpose of this GPG nuclear safety means nuclear and radiological safety, security of nuclear materials and protection of the environment from radioactive discharges/disposals.
Operations	Maintenance, examination, testing and operation of the plant and the treatment, processing, keeping, storing, accumulating or carriage of any radioactive material or radioactive waste. For the purpose of this GPG operations includes decommissioning.

Organisational change	Any change to organisational structure or resources. For the purposes of this GPG this would also include any change which may have an impact upon the organisation's capability.
Outsourcing	The transfer, wholly or in part, of organisational capability from the organisation to an external service provider.
Post	A position identified on an organisational structure.
Role	A specific work activity/responsibility which may wholly or in part contribute to a post or be assigned to an individual.
Service provider	Any person or organisation not in direct employment of the organisation that provides a service to that organisation. This includes contractors.

APPENDIX B Typical Nuclear Baseline roles

These lists are not prescriptive. They provide guidance on types of roles that should be considered when carrying out a review.

Work category	Examples of roles that may be in the Nuclear Baseline
Undertaking (Hands-on work with radioactive materials)	<ul style="list-style-type: none"> ■ Chemists ■ Control room operators ■ Emergency responders ■ Engineering technicians ■ Glovebox/cell workers ■ Maintainers ■ Nuclear lift operators ■ Process workers ■ Roles undertaking discharge monitoring ■ Source owner ■ Transport operators
Defining (Includes policy setting, interpretation, specification)	<ul style="list-style-type: none"> ■ Process owners ■ Specifying arrangements to support standards/policy/ process setting
Directly supporting	<ul style="list-style-type: none"> ■ Approved dosimetry service ■ Assessing certifying nuclear competence ■ Criticality advisers ■ Health physicists ■ Record keeping ■ Research and development resources that support the existing nuclear safety capability ■ Safety case authors ■ Training providers offering role-specific training within the Nuclear Baseline (if internal or the IC role if outsourced)
Supervising (Includes control and supervision)	<ul style="list-style-type: none"> ■ ASQEP appointed under the Radioactive Substances Act (RSA) ■ Confined space supervisor ■ Duly authorised person ■ Radiation protection supervisor ■ Safe system of work issuers ■ Superintending officer for waste disposal ■ Team leaders

Work category	Examples of roles that may be in the Nuclear Baseline
Managing (Includes reviewing, challenging, assuring, oversight, governance and leadership)	<ul style="list-style-type: none"> ■ Authorisation group chairman ■ Authorised person (electrical) ■ Building owner ■ Chemistry services managers ■ Commissioning managers ■ Construction managers ■ Dangerous goods safety advisor/site movement liaison officer ■ Design authority ■ Directors (executive and non-executive, role dependant, e.g. finance director) ■ Emergency planning ■ Environmental managers ■ Excavation inspector ■ Independent inspectors ■ Independent peer review ■ Intelligent Customers ■ Line managers ■ Logistics managers ■ Manager of tenanted facilities ■ Members of the site licence company senior team ■ Members of safety committees ■ Project managers ■ Qualified expert (RSA93) ■ Qualified person (IRR99) ■ Radiation Protection Advisor ■ Radioactive Waste Advisor ■ Roles that interface or manage the interface with external organisations ■ Safeguards (Nuclear Materials Accountancy) ■ Safety case assessors ■ Safety case owner ■ Safety Manager (nuclear) ■ Security ■ Senior authorised person (electrical) ■ Shift managers

In general the following functions would not be expected to be captured within the Nuclear Baseline unless specific individuals are carrying out nuclear safety specific roles – finance, commercial, procurement, human resources, programmes and general administration/non-nuclear trades.

APPENDIX C Related References

International Atomic Energy Agency

IAEA set out general expectations of nuclear licensees in the following 'INSAG' publication:

Managing change in the nuclear industry: The effects on safety INSAG-18
www-pub.iaea.org

More detailed practical guidance is provided in:

Managing change in nuclear utilities IAEA-TECDOC-1226
www-pub.iaea.org

UK legal requirements

Nuclear Installations Act 1965 (as amended). Under this Act the Office for Nuclear Regulation issues nuclear site licences. These have standard Licence Conditions - Licence Condition 36 concerns the management of organisational capability. Full details of the standard nuclear site Licence Conditions are found on the ONR website.

ONR guidance

note: web links will change (see www.onr.org.uk) following ONR becoming a statutory corporation on the 1st April 2014

ONR publishes the internal technical guidance used by its inspectors on the HSE website:
www.hse.gov.uk/foi/internalops/nsd/tech_asst_guides/index.htm

Specific guidance relevant to this GPG includes:

- T/AST/027 - Training and assuring personnel competence.
- NS-TAST-GD-048 - Organisational capability.
- NS-TAST-GD-049 - Licensee use of contractors and intelligent customer capability.
- NS-TAST-GD-061 – Staffing levels and task organisation.
- NS-TAST-GD-065 - Function and content of the Nuclear Baseline.
- NS-TAST-GD-072 - Function and content of a Safety Management Prospectus.
- NS-TAST-GD-079 - Licensee design authority capability.
- T/AST/080 – Nuclear safety advice and challenge.

HSE publishes concise general external guidance for the high hazard industries on organisational change.

Organisational change and major accident hazards Chemical Information Sheet CHIS7 HSE Books 2003 <http://www.hse.gov.uk/pubns/chis7.pdf>

HSE publishes a research report setting out a methodology for calculating minimum staff requirements in control rooms:

Assessing the safety of staffing arrangements for process operations in the chemical and allied industries CRR348 http://www.hse.gov.uk/research/crr_pdf/2001/crr01348.pdf

Environmental guidance

The Environment Agency sets out its expectations for organisational capabilities to meet the requirements of the Radioactive Substances Regulations (2006) in the following guidance:

(Update with current guidance) Radioactive Substances Regulation – Environmental Principles RSR 1

<http://cdn.environment-agency.gov.uk/geho0709bqsb-e-e.pdf>

Radioactive Substances Regulations: Management Arrangements at Nuclear Sites

www.environment-agency.gov.uk/static/documents/Business/GEHO0709BQXB-E-E.pdf

Ministry of Defence requirements

MoD requirements relevant to this GPG include:

- JSP 518 – Regulation of Naval Nuclear Propulsion Programme.
- JSP 471 – Defence Nuclear Accident Response.
- JSP 538 – Regulation of the Nuclear Weapons Programme.

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APPENDIX E Key Points

- 1 The licensee should understand its core capability and maintain it within its own organisation
- 2 Careful consideration needs to be given to the design of an organisation to ensure nuclear safety functions are identified and resources assigned.
- 3 In order to be consistent and meaningful the Nuclear Baseline should represent the 'fully capable organisation' not the minimum required for safe operation or shutdown – i.e. that necessary to sustain nuclear safety during normal operations and reasonably foreseeable events.
- 4 Relevant roles at all levels and employment status should be considered for inclusion in the Nuclear Baseline.
- 5 Category 1 service providers should be in a Nuclear Baseline.
- 6 A nuclear safety post or role is defined as one where an action or inaction by the individual or group:
 - undertaking
 - supervising
 - managing
 - governing
 - overseeing
 - assuring
 - challenging
 - defining or
 - directly supportingwork could pose an immediate or latent threat to nuclear safety.
- 7 The licensee should determine the number of staff required to fulfil the posts and roles identified in the Nuclear Baseline, be able to demonstrate that this is adequate for nuclear safety and monitor and manage the risks arising from any variance.
- 8 Having established and assessed the adequacy of the Nuclear Baseline the licensee should ensure these competences and resources are adequate and sufficiently resilient to meet the current and future demands and take appropriate corrective or mitigating action where there are weaknesses.
- 9 Action should be taken to manage gaps and vulnerabilities in the Nuclear Baseline.
- 10 Stakeholders should be actively engaged at the earliest opportunity and through all parts of the change process.
- 11 All changes shall be assessed and approved in advance of being implemented and not 'salami-sliced' into smaller units.

- 12 For complex, compound changes there should be an overarching change proposal setting out the means of controlling risks.
- 13 All changes (including temporary changes) that may have a potential impact on nuclear safety should be categorised in relation to the risks of the unmitigated risks arising from the change should it be ill conceived or poorly implemented.
- 14 Change implementation needs to be monitored and variance to and deviation from the plan controlled.
- 15 Lessons learnt from organisational changes should be captured and disseminated appropriately.
- 16 Effective oversight should be in place to assess and control the cumulative effect of multiple changes.
- 17 Periodic review of the Nuclear Baseline should be undertaken at least annually to ensure that it is current and accurate.
- 18 Governance of capability should be a key consideration of senior management and should be integrated into the overall company governance structure.